I. Title: Air Pollution Health Messaging
Contractor Name: Industrial Economics Inc.
Contract #: EP-D-14-032 WA# 3-43

II. Work Assignment Manager (WAM):

Ray Garlington
U.S. Environmental Protection Agency
ORD/NHEERL
EPHD (Mail Code 58A)
109 T.W. Alexander Dr., Research Triangle Park, NC 27709
Phone: (919) 966-6269
garlington.ray@epa.gov

Alt. WAM:
Patricia McGhee
U.S. Environmental Protection Agency
ORD/IOAA
NPD/ACE Team (Mail Code D143-01)
109 T.W. Alexander Dr., Research Triangle Park, NC 27709
Phone: (919) 541-2607
Mcghee.patricia@epa.gov

III. Level of Effort:

Level of Effort: XXX hours
Duration: Through 9/15/2018
Estimated Completion Date: 2/28/18

IV. Background:

Ambient $PM_{2.5}$ is causally linked to cardiovascular morbidity and mortality, as well as a wide range of other health effects. A recent article in JAMA Cardiology (Brook, Newby, and Rajagopalan, 2017) makes the case that studies are needed to evaluate the effectiveness of personal level interventions to reduce exposures to $PM_{2.5}$ and to improve individual and public health.

The U.S. EPA held a workshop (Preventing Air Pollution-related Cardiopulmonary Illnesses: Innovative, Cross Disciplinary Solutions) in 2016 to better understand barriers to and opportunities for interventions that prevent air pollution-induced cardiovascular diseases. Participants in the workshop identified air pollution risks for individuals as small, while recognizing that the overall health burden in the U.S. population from air pollution is significant due to ubiquitous exposures among millions of individuals rendered at higher risk because of a concomitant chronic cardiopulmonary disease, vascular disease, diabetes and low socioeconomic status. Risks to these individuals are of particular concern where air pollution episodes with high concentrations of $PM_{2.5}$ still occur in parts of the U.S. Local meteorological conditions coupled

with high emissions, e.g. in Salt Lake City, or from emissions related to events such as wildland fires are not unusual.

Before embarking on studies to assess effectiveness of physical interventions (such as in-home filters or N95 respirators) on clinically relevant health outcomes, it is critically important to establish the optimal approach to communicate air quality and health information along with information on potential ways to reduce health risks. The goal is to increase environmental health literacy among healthcare professionals and the at-risk population, such that healthcare professionals support and promote an appropriate intervention and that their patients will take action to reduce exposure during high pollution events. The overall effort will leverage ongoing relationships with CDC/CMS' *Million Hearts 2022* that has incorporated into its new program a recommendation that health care providers educate patients with recent history of a myocardial infarction or coronary artery by-pass surgery to avoid exposure to high levels of $PM_{2.5}$.

This project will apply social science methods in the development and delivery of risk messages; in improving understanding of how individual trust in those providing risk information can affect the response to the information; and in identifying barriers (including culture, knowledge, attitudes, and resources) to individuals effectively engaging in protective actions.

An important objective of this project is to understand how at-risk populations and healthcare professionals receive, interpret, and act on (or in the case of health care providers -- educate using) messages related to air quality, health risk, and exposure averting behaviors, and what barriers exist to taking appropriate action based on those messages. The at-risk population in this study is defined as individuals who are enrolled in Cardiac Rehabilitation Programs after sustaining a myocardial infarction, coronary artery intervention and/or coronary artery bypass surgery with varying socio-behavioral characteristics. Health care professionals includes physicians and nurse practitioners. As a first step to achieving this objective, air quality and health risk messages will be developed and focus groups run by facilitators with training in the social sciences will be required to evaluate alternative approaches to health risk messaging and solicit input on message delivery preferences. Information from this phase of the study can help to improve the message content and delivery and the design of future intervention strategies.

Task 1 Combined Quality Assurance Project Plan (QAPP) and Project Workplan

Modify the combined Quality Assurance Project Plan (QAPP) and Project Workplan (WP) submitted for Work Assignment number 2-33 as appropriate to reflect progress to date. The QAPP must follow the requirements outlined in EPA Requirements for QA Project Plans (QA/R-5) (EPA 2001) (https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf). The combined QAPP / WP must be approved by EPA prior to the start of any sample or data collection, use, or analysis. Submit the QAPP/WP within 30 days of receiving the work assignment. Teleconference with WAM and EPA staff every two weeks to discuss project details.

Task 2: Participate in Development of Risk Messages

The Contractor shall assist in the development of messages that communicate information on air quality, health risk, and exposure reducing behaviors. Messages shall be developed to test 3 different groups on the understanding of health risk messages about air quality impacts on health to promote the adoption of health protective behaviors: 1) to test messages that educate health care professionals; 2) to test messages that educate patients; and 3) to test messages that health care providers use to educate their patients. EPA will provide information on the types of air quality, health risk, and exposure-averting behaviors or strategies that should be incorporated into messages, along with specific goals for the focus group sessions. The Contractor shall apply best practices from the social sciences in developing potential messages, including insights from communications studies, psychology, behavioral economics, behavioral health, anthropology, sociology, and other relevant literature. In order to effectively communicate information about intervention strategies, EPA will characterize specific behaviors or strategies by their technical, economic, and social dimensions, and that information will be used to inform the message content. The Contractor shall prepare draft messages based on discussions with EPA and review background materials provided by EPA on air quality, health risk, and current public outreach efforts.

Task 3: Development of Scripts

Based on the draft messages and the goals for the focus groups provided by EPA, the Contractor shall develop draft focus group scripts and provide those to the WAM. The Contractor shall design scripts to obtain feedback from focus groups on: current and preferred message delivery mechanisms for receiving and accessing these messages; the content of these messages; how well the messages are understood by different types of audiences; and, interpretation of the messages in terms of the ability of different audiences to use the information in the messages to engage in activities to reduce exposure to air pollution during high PM2.5 events. Based on comments from the WAM, the Contractor shall finalize the focus group scripts. During the execution of this task, the Contractor shall participate in biweekly meetings with the WAM and EPA staff to review draft messages and questions and to prepare for focus group studies.

Task 4: Focus Group Studies/Interviews

The Contractor shall manage the development and implementation of focus group studies using the scripts to test the effectiveness and understanding of air pollution messaging for health care professionals, and at-risk cardiopulmonary patients. The Contractor shall use staff with experience in focus group studies to plan, execute, evaluate and provide feedback to the WAM for three small (no more than 9 participants) focus group studies, including one group of health care professionals (nurses, nurse practitioners, and physicians), one group of cardiopulmonary patients (individuals who are enrolled in Cardiac Rehabilitation Programs local to North Carolina), and one group a mix of both. To the extent possible, the Contractor shall seek to have representatives of different socioeconomic, racial, gender, and cultural groups in the focus groups.

The focus groups will explore methods for communicating information about air quality and health risks during poor air quality episodes, and communicating information about ways that at-risk individuals can reduce exposures and health risks during the episodes. This will include

evaluations of the social, cultural, or economic barriers that might prevent effective communication of risk information, inhibit understanding of how to effectively employ an intervention strategy, or prevent employment of the intervention strategy.

Task 5: Final Report

Upon technical direction from EPA, the Contractor shall provide a written report to EPA on the design, execution, and conclusions of the focus group studies, including transcripts of focus group discussion, summaries of focus group participant responses, and summaries of overall discussions and study-data quality.

The Contractor shall adhere to the following schedule:

Task	Deliverable	Due Date
1	Biweekly telephone conferences	Ongoing
	Draft Messages, Updated QAPP/Work Plan and Cost Estimate	October 6
	Final Messages	October 20
2	Draft Scripts	October 20
	Final Scripts	November 3
3	Identify focus group participants	November 2017
	Conduct Focus Group Studies	November 2017
4	Deliver final summaries	1 Month after conclusion of focus group studies
	Deliver transcripts	1 Month after conclusion of focus group studies
5	Final report with conclusions	As agreed upon by Contractor and WAM (approximately 2/15/2018)

VII. Reporting Requirements:

The Contractor shall provide monthly progress reports in accordance with the terms of the contract. The Contractor shall submit work products in .pdf and Microsoft Office compatible formats.